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(58) Field of Search

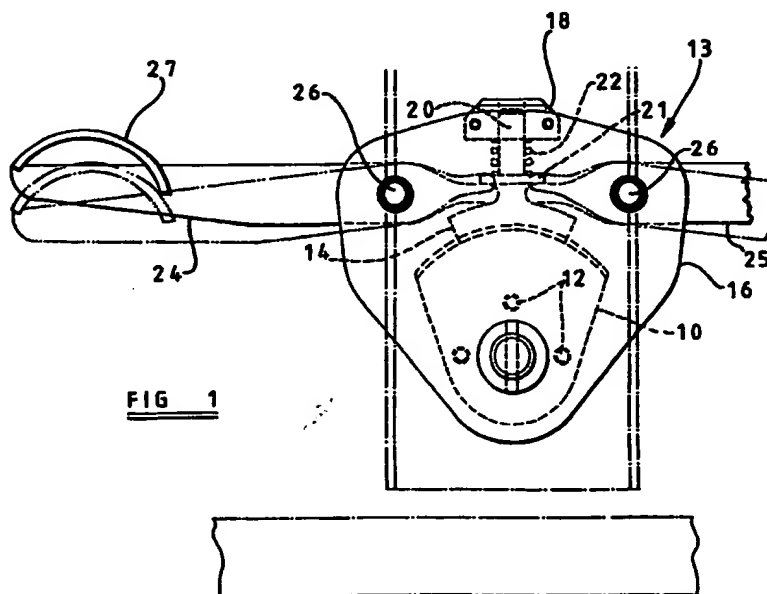
UK CL (Edition N ) B8H HAC HAX HEX , F2E EU , F2V  
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(54) An actuating device

(57) An actuating device comprises a fixed circular or part circular gear 10, a holder 13 mounted for angular movement about the axis of the fixed gear, a movable part circular gear 14 slidably supported by the holder for movement into and out of engagement with the fixed gear, a spring 22 urging the movable gear into engagement with the fixed gear, and at least one operating member 24, 25 supported by the holder and movable relative thereto in one direction to initially disengage the movable gear from the fixed gear and to thereafter angularly displace the holder relative to the fixed gear until released. Preferably two members 24, 25 are provided operating in opposite directions. Preferably the member(s) 24, 25 are foot operated. Preferably the mechanism is provided as part of an invalid hoist (Figs 3 - 5) moving its support legs (34).



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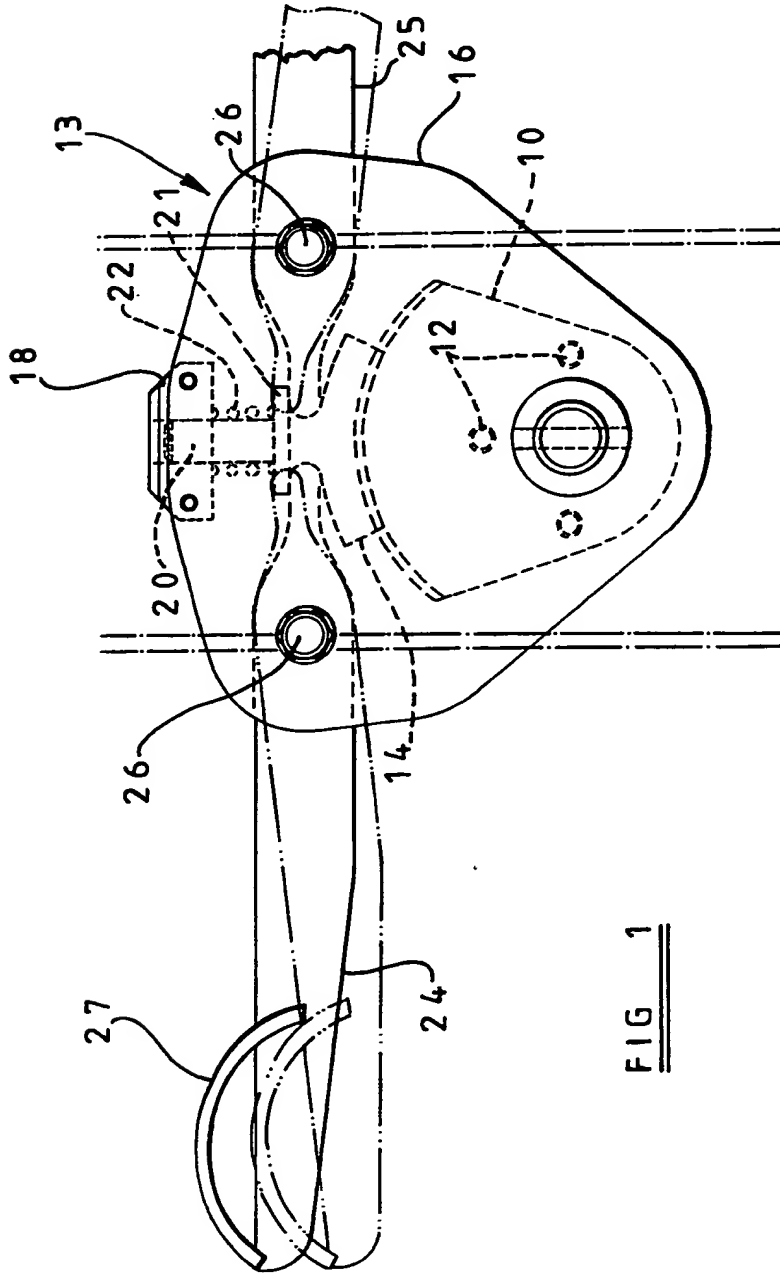


FIG 1

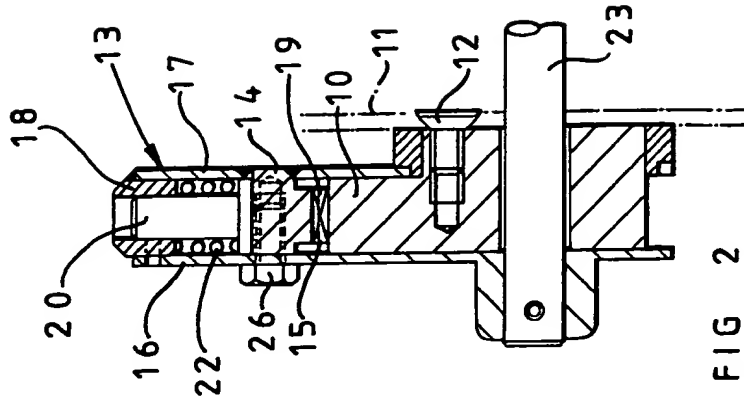
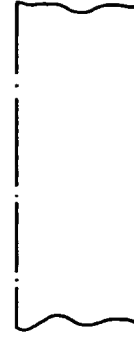
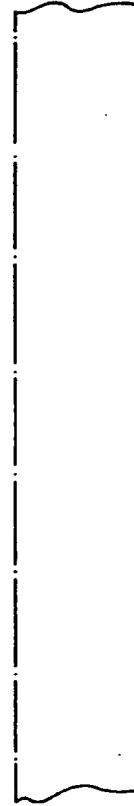


FIG 2



2 / 3

FIG 3

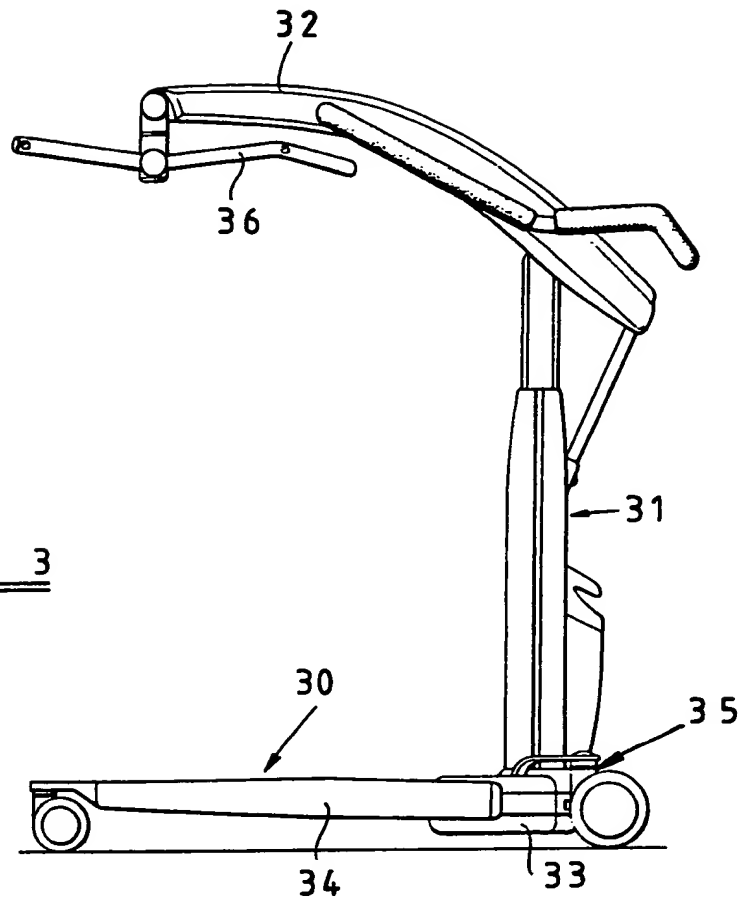
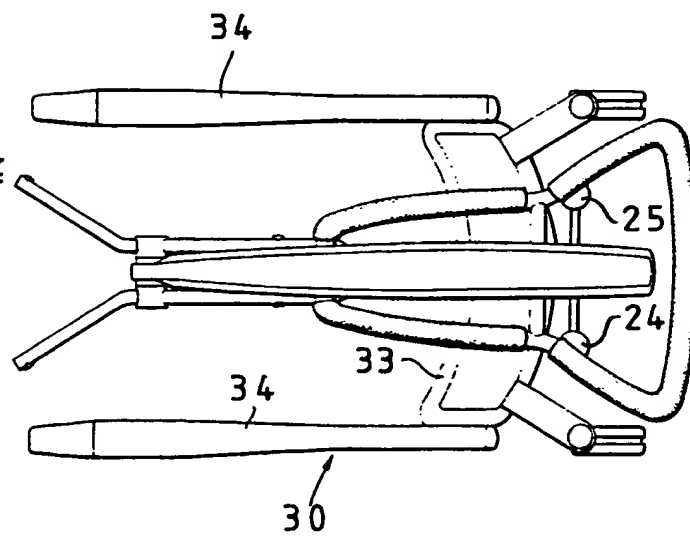
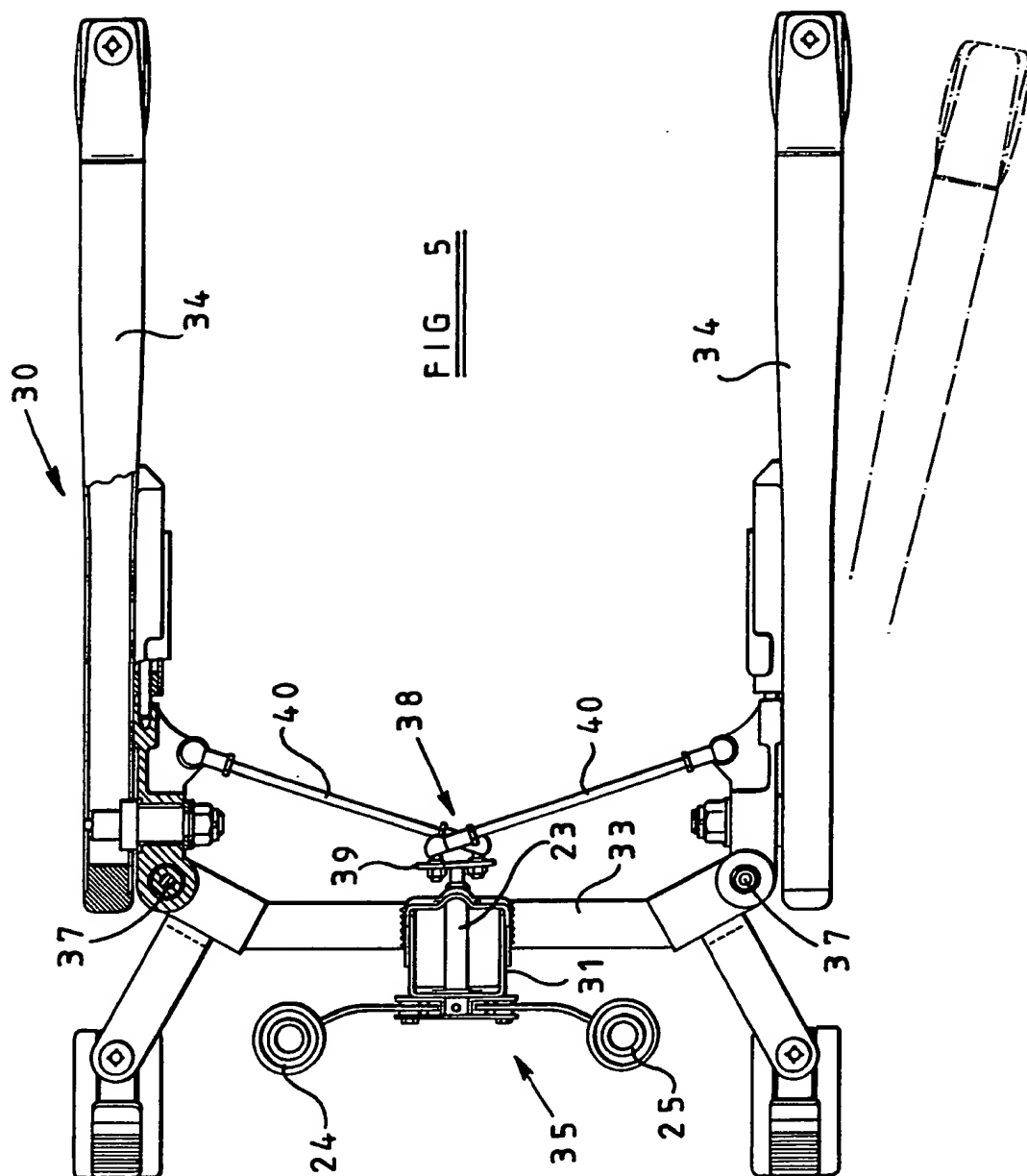


FIG 4





## AN ACTUATING DEVICE

This invention relates to an actuating device and more particularly, but not exclusively, to such a device for use on an invalid hoist.

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Known invalid hoists commonly comprise a mobile chassis, a mast upstanding from the chassis and a lifting arm supported by the mast. The chassis commonly comprises a main chassis portion which supports the mast and which extends transversely of the chassis and two side members which extend forwardly of the main chassis portion. It is also common to provide a device for spreading at least the free ends of the side members apart so that the chassis can fit around a wheelchair.

Known mechanical devices for spreading the side members apart can be locked in one of only two positions, namely a position in which the side members are fully retracted and a position in which the side members are fully extended. This is not entirely satisfactory and the present invention seeks to provide an actuating device which is self-locking in a larger number of positions.

According to a first aspect of the present invention, there is provided an actuating device comprising a fixed circular or part circular gear, a holder mounted for angular movement about the axis of the fixed gear, a movable part circular gear slidably supported by the holder for movement into and out of engagement with the fixed gear, spring means urging the movable gear into engagement with the fixed

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gear, and at least one operating member supported by the holder and movable relative thereto in one direction to initially disengage the movable gear from the fixed gear and to then angularly displace the holder relative to the fixed gear.

5            Preferably, the actuating device has two said operating members, one of which will angularly displace the holder in one direction relative to the fixed gear after disengaging the movable gear from the fixed gear and the other of which will angularly displace the holder in an opposite direction relative to the fixed gear after disengaging the movable gear from the fixed gear.

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            Preferably, the or each operating member is pivotably connected to the holder and, in this case, the or each operating member is, preferably, in the form of a lever arm having a first limb engageable with the movable gear and a second limb movable by an operator.

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            Conveniently, the holder is fixed to a shaft coaxial with the axis of the fixed gear.

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            According to a second aspect of the invention, there is provided an invalid hoist comprising a mobile chassis, an upstanding support structure or column mounted on the chassis and a lifting arm connected to the support structure or column, the chassis comprising a main portion supporting the support structure or column and two chassis side members which project forwardly of the main portion and the hoist also having an actuating device according to the first aspect of the invention for moving

the side members relative to one another.

Preferably, the side members are pivotably connected at or adjacent to their rear ends to the main chassis portion and the actuating device is connected to the two side members to simultaneously pivot the two side members in opposite angular directions.

The invention will now be more particularly described, by way of example, with reference to the accompanying drawings in which:

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Figure 1 is a front view of one embodiment of an actuating device according to the invention;

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Figure 2 is a section taken through the actuating device of Figure 1;

Figure 3 is a side view of an invalid hoist incorporating the actuating device of Figures 1 and 2;

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Figure 4 is a plan view showing the invalid hoist of Figure 3, and

Figure 5 is a sectional view showing the linkage arrangement connecting the actuating device to the side members of the chassis of the invalid hoist.

Referring firstly to Figures 1 and 2 of the drawings, the actuating device

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shown therein comprises a first part circular gear 10 which is fixed to a support surface 11, such as by screws 12, a holder 13 mounted for angular movement about the axis of the gear 10 and a second part circular gear 14 supported by the holder 13.

5           The gear 10 is a sector gear having a plurality of teeth 15 extending parallel to the axis of the gear.

          The holder 13 comprises front and rear spaced plate members 16 and 17, respectively, and a slide block 18 secured between the two plate members 16 and 17.  
10   The front plate member 16 is secured to a shaft 23 extending coaxially through the sector gear 10.

          The gear 14 is in the shape of an arcuate shoe and has, on its inner surface, a plurality of teeth 19 extending parallel to the teeth 15 of the gear 10. The gear 14  
15   also has a stem 20 projecting radially from its outer surface. A flange 21 is provided on the stem 20 intermediate the ends thereof. The free end of the stem 20 is slidably received in a through bore in the slide block 18. A compression spring 22 is provided between the slide block 18 and the flange 21 to urge the gear 14 into engagement with the gear 10.

20

          The actuating device also comprises two operating members 24 and 25. The operating members 24 and 25 are mounted between the plate members 16 and 17 on opposite sides of the gear 14 and are in the form of lever arms pivotable about respective pins 26. One end of each operating member 24 and 25 engages the



underside of the flange 21 on the stem 20 of the gear 14 and the other end of each operating member 24 and 25 projects laterally from the holder 13 so that the operating member can be pivoted by an operator. Typically, and as shown, each operating member 24 and 25 has a pad 27 on its upper surface for foot operation.

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In use, when a downward pressure is applied to the outer end of the operating member 24, the member 24 will initially pivot in a counterclockwise direction about its respective pin 26 and the inner end of the member 24 will raise the gear 14 out of engagement with the gear 10 against the urging force of the spring 22.

10 The holder 13 and gear 14 will then move angularly in a counterclockwise direction about the fixed gear 10 until pressure on the operating member 24 is released whereupon the spring 22 will urge the gear 14 into engagement again with the gear 10. This will lock the holder 13 against further angular movement until one or other of the operating members 24 and 25 is depressed. A downward pressure on the

15 operating member 25 will have much the same effect but in this case the holder 13 and gear 14 will move angularly in a clockwise direction about the fixed gear 10.

Angular movement of the holder 13 is transmitted by the shaft 23 to, for example, a linkage arrangement.

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The actuating device described above has the advantage that it is self-locking in any one of a plurality of discrete positions determined by the number of teeth on the gears 10 and 14.

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Figures 3 to 5 show an invalid hoist incorporating an actuating device as described above. The hoist comprises a mobile chassis 30, a mast 31 upstanding from the chassis and a lifting arm 32 pivotably connected to the upper end of the mast 31. A sling hanger 36 is supported by the free end of the lifting arm 32. The chassis 30 comprises a main chassis portion 33 which supports the mast 31 and which extends transversely of the hoist and two side members 34 extending forwardly of the main chassis portion. The side members 34, as shown, extend parallel to one another but they are each connected to the main chassis portion for pivotable movement about respective pivot pins 37 (see Figure 5) so that they can be spread apart at their open ends to allow the chassis to fit around a wheelchair. An actuating device as described above is mounted on the chassis behind the mast 31. This actuating device is denoted by reference numeral 35 and has two foot operable operating members 24 and 25. The shaft 23 of the actuating device 35 is connected to the two side members 34 by a linkage arrangement 38 (see Figure 5) for simultaneously pivoting the side members in opposite angular directions relative to the main chassis portion 33. The linkage arrangement 38 comprises a lever arm 39 secured to the free end of the shaft 23 and two links 40 connected between opposite ends of the lever arm 39 and respective side members 34.

The invention is not limited to the use of the actuating device on an invalid hoist as the actuating device could have application elsewhere.

The above embodiment of the actuating device is given by way of example only and various modifications will be apparent to persons skilled in the art without

departing from the scope of the present invention. For example, the gear 10 could be a circular gear and there may be only one operating member 24, 25.

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CLAIMS

1. An actuating device comprising a fixed circular or part circular gear, a holder mounted for angular movement about the axis of the fixed gear, a movable part  
5 circular gear slidably supported by the holder for movement into and out of engagement with the fixed gear, spring means urging the movable gear into engagement with the fixed gear, and at least one operating member supported by the holder and movable relative thereto in one direction to initially disengage the movable gear from the fixed gear and to then angularly displace the holder relative to the fixed  
10 gear.
2. An actuating device as claimed in claim 1, having two said operating members, one of which will angularly displace the holder in one direction relative to the fixed gear after disengaging the movable gear from the fixed gear and the other  
15 of which will angularly displace the holder in an opposite direction relative to the fixed gear after disengaging the movable gear from the fixed gear.
3. An actuating device as claimed in claim 1 or claim 2, wherein the or each operating member is pivotably connected to the holder.  
20
4. An actuating device as claimed in claim 3, wherein the or each operating member is in the form of a lever arm having a first limb engagable with the movable gear and a second limb movable by an operator.

5. An actuating device as claimed in any one of the preceding claims, wherein the holder is fixed to a shaft coaxial with the axis of the fixed gear.

6. An actuating device substantially as hereinbefore described with reference to the accompanying drawings.

7. An invalid hoist comprising a mobile chassis, an upstanding support structure or column mounted on the chassis and a lifting arm connected to the support structure or column, the chassis comprising a main portion supporting the support structure or column and two chassis side members which project forwardly of the main portion, the hoist further comprising an actuating device as claimed in any one of the preceding claims for moving the side members relative to one another.

8. An invalid hoist as claimed in claim 7, wherein the side members are pivotably connected at or adjacent to their rear ends to the main chassis portion and the actuating device is connected to the two side members to simultaneously pivot the two side members in opposite angular directions.

Patents Act 1977

Examiner's report to the Comptroller under Section 17  
(The Search report)Application number  
GB 9504427.7

## Relevant Technical Fields

(i) UK Cl (Ed.N) B8H (HAC, HAX, HEX) F2E (EU) F2V  
(UW33) F2Y (YSL)(ii) Int Cl (Ed.6) A61G 7/10, B60T 7/04, G05G 5/12, 5/14,  
5/18, 5/20, 5/24

## Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent  
specifications.

(ii) -

Search Examiner  
D McMUNNDate of completion of Search  
1 MAY 1995Documents considered relevant  
following a search in respect of  
Claims :-  
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- X: Document indicating lack of novelty or of inventive step. P: Document published on or after the declared priority date but before the filing date of the present application.
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| Category | Identity of document and relevant passages |   | Relevant to claim(s) |
|----------|--|---|----------------------|
| Y        | GB 0922245                                 | (E.C.F) note gears 14, 15   | 1, 7, 8              |
| Y        | GB 0820497                                 | (HOYER) see whole document  | 1, 7, 8              |
| Y        | GB 0769160                                 | (CATERPILLAR) note gear 33  | 1, 7, 8              |
| Y        | US 4597307                                 | (TOYOTA) see whole document<br>[one example of a number of this type] | 1                    |

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